

WHAT IS CLAIMED IS:

- 1 1. A method of transmitting a code division multiple access
2 (CDMA) frame in a cellular communications network, the method
3 comprising the steps of:
4 providing the CDMA frame so as to include a plurality of slots and
5 at least a portion of a transmission gap (TG);
6 defining the transmission gap using a spreading factor (SF) and
7 redundancy of information bits to be transmitted; and
8 transmitting the frame, including the plurality of slots, on a channel.
- 1 2. The method of claim 1, wherein said transmitting step comprises
2 transmitting the frame on an uplink from a mobile station (MS) to a base
3 station (BS) in the network; and
4 wherein said defining step includes defining the transmission gap
5 using a reduced spreading factor and increased redundancy.
- 1 3. The method of claim 2, wherein the channel is an uplink
2 dedicated physical data channel.
- 1 4. The method of claim 2, wherein the transmission gap is located
2 between first and second slots in the frame.
- 1 5. The method of claim 2, further comprising reducing the
2 spreading factor by a factor of two, and increasing the redundancy of
3 information bits to be transmitted so that the transmission gap length is less
4 than a length of half the frame.

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7. The method of claim 1, wherein the frame is transmitted on one of an uplink and a downlink;
the method further comprising spreading the information bits to be transmitted on a higher rate data signature sequence to produce a coded information signal; and
intermittently transmitting coded information signals in a compressed mode using the reduced spreading factor with a reduced spreading ratio, wherein a frame transmitted in the compressed mode includes a first part having a time duration of less than a duration of the entire frame and a second part also having a time duration of less than the duration of the entire frame.

8. A method of transmitting spread spectrum frames, the method comprising the steps of:

- providing data to be transmitted on a channel;
- spreading a first portion of the data on a higher rate sequence using a first spreading factor to produce a first coded information signal including a first frame including a plurality of slots;
- transmitting the first frame, including all slots thereof, on the channel;
- forming a compressed mode frame by spreading a second portion of the data on a higher rate sequence using a second spreading factor to produce a second coded information signal including a second frame,

12 wherein the second spreading factor is less than the first spreading factor so
 13 that the second frame includes at least a portion of a transmission gap
 14 having a length less than half the number of total slots in the second frame;
 15 and
 16 transmitting the second frame on the channel.

1 9. The method of claim 8, further comprising defining a length of
 2 the transmission gap using increased redundancy of bits on a transport
 3 channel and the second spreading factor so that the transmission gap has a
 4 length less than a length of half the second frame.

1 10. A compressed mode spread spectrum frame to be transmitted on
 2 a channel, the frame comprising:
 3 a plurality of time slots;
 4 a transmission gap defined between first and second ones of the time
 5 slots in the frame; and
 6 wherein a length of the transmission gap is less than half of a time
 7 length of the entire frame, with the transmission gap length being defined at
 8 least in part by using a first spreading factor reduced by a factor of two
 9 relative to a second spreading factor which also may be used on the
 10 channel.

1 11. The frame of claim 10, wherein the length is defined at least in
 2 part by rate matching using increased redundancy of bits to be transmitted,
 3 and the frame is either an uplink frame or a downlink frame.

1 12. A method of transmitting a compressed mode frame in a
 2 communications network, comprising the steps of:

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6 means for forming a transmission gap (TG) having a transmission
 7 gap length (TGL) in the frame by using a reduced spreading factor (SF) and
 8 an increased redundancy of information bits to be transmitted; and
 9 a transmitter for transmitting the frame from the mobile station to
 10 the base station.

1 17. The apparatus of claim 16, wherein said means for forming a
 2 transmission gap comprises a spreading circuit and a rate matching circuit.

1 18. An apparatus for transmitting an uplink compressed mode frame
 2 in a CDMA based communications network, the apparatus comprising:

3 means for forming the uplink compressed mode frame so as to
 4 include a plurality of slots and a transmission gap of length TGL;

5 means for repeating a number of format indicator bits from a first
 6 slot in the frame in a second slot of the frame; and

7 wherein the format indicator bits to be repeated are determined at
 8 least in part based upon at least one of (a) the length of the transmission
 9 gap, and (ii) a location of the transmission gap

1 19. An apparatus for transmitting a spread spectrum frame in a
 2 cellular communications network, the apparatus comprising:

3 a spreading circuit spreading bits to a bit rate using a code with a
 4 reduced spreading factor and including the spread bits in a frame which
 5 includes a plurality of time slots and a transmission gap therein; and

6 a rate match defining a length of the transmission gap using
 7 increased redundancy of at least some of the bits.

1 20. The apparatus of claim 19, wherein the spread spectrum frame is
2 a CDMA frame, and wherein the transmission gap is located between first
3 and second slots of the frame.

1 21. The apparatus of claim 19, further comprising a transmitter for
2 transmitting the frame in an uplink from a mobile station to a base station in
3 the cellular communications network.

1 22. The apparatus of claim 19, wherein the length of the
2 transmission gap is variable via said rate match.

1 23. A mobile station for use in a cellular communications network,
2 said mobile station comprising:

3 a spreading circuit spreading bits to a bit rate using a code with a
4 reduced spreading factor and including the spread bits in a frame which
5 includes a plurality of time slots and a transmission gap therein; and

6 a rate match defining a length of the transmission gap using
7 increased redundancy of at least some bits.

1 24. The mobile station of claim 23, wherein said mobile station is a
2 cellular phone.

1 25. A method of transmitting a code division multiple access
2 (CDMA) uplink frame in a cellular communications network, the method
3 comprising the steps of:

4 providing the CDMA frame so as to include a plurality of slots and
5 at least a portion of a transmission gap (TG);

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6 defining the transmission gap using one of a spreading factor (SF)
7 and redundancy of information bits to be transmitted; and
8 transmitting the uplink frame, including the plurality of slots, on a
9 channel from a mobile station to a base station of the network.

1 26. The method of claim 25, wherein said defining a transmission
2 gap step comprises using a reduced spreading factor and increased
3 redundancy of information bits to be transmitted.

1 27. A method of transmitting a compressed mode frame in a
2 communications network, comprising the steps of:
3 forming a frame including a plurality of slots and a transmission gap
4 of length TGL; and
5 repeating a number of control bits from a first slot in the frame in a
6 second slot of the frame in order to increase redundancy of control bits.

1 28. The method of claim 27, further comprising transmitting the
2 frame on either an uplink or downlink.

1 29. The method of claim 27, further comprising determining which
2 control bits are to be repeated based at least in part upon the location of the
3 transmission gap in the frame, and wherein the control bits are at least one
4 of TPC bits, TFCI bits, and pilot bits.

1 30. A method of transmitting a compressed mode frame in a
2 communications network, comprising the steps of:
3 forming a frame including a plurality of slots and a transmission gap
4 of length TGL; and

1 31. The method of claim 30, wherein certain of the control bits are
2 transmitted in slots forming a transmission gap in the information bits.